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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/425,694	10/22/1999	ROLAND BRUNNER	BRUNNER-ET-A	9906

7590

11/14/2002

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EXAMINER

BROWN, CHARLOTTE A

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 11/14/2002

27

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/425,694

Applicant(s)
Brunner et al.

Examiner
Charlotte Brown

Art Unit
1765



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Aug 14, 2002
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- *See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pirooz (EP 0731498 A2) in view of Verhaverbeke et al. (US 6,132,522).

From line 32 of column 2 to the end of column 3, Pirooz discloses a method for treating a silicon wafer which includes the step of contacting the surface of the silicon wafer with an aqueous solution containing hydrofluoric acid to remove the metals from the wafer surface. The removal is carried out by contacting the silicon wafers with an aqueous solution containing about 1:1 to 1:10,000 parts by volume HF:H₂O. To enhance the metals removal, the solution may additionally contain HCl, H₂O₂ OR O₃ (Column 2, lines 49-54). This reads on the applicant's limitation of firstly treating the semiconductor wafers in a bath with an aqueous HF solution and optionally containing HCl and optionally a surfactant. Next, the wafers are contacted with high

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purity ozonated water containing ozone (Column 3, lines 14-15). This reads on the applicant's limitation of treating the wafers in a bath with an aqueous O_3 solution only containing O_3 . The aqueous ozone solution may additionally contain hydrochloric acid (HCl) or nitric acid. (Column 3, lines 32-34). After the metals removal, the silicon wafers are rinsed in deionized water (Column 3, lines 8-10). The final step of the cleaning process is drying the oxidized wafers. The wafers may be dried using any method which does not recontaminate the wafers with metals or other contaminants. Such methods include conventional spin drying and isopropyl alcohol vapor drying techniques which are well known in the field.

Unlike the claimed invention, Pirooz does not disclose a method for forming the treatment sequence B₂ by treating the semiconductor wafer with an aqueous O_3 solution and then treating the semiconductor wafers in a bath with an aqueous HCl solution only containing HCl. Since Pirooz first treats the semiconductor wafer with an ozone in water and then optionally adds hydrochloric acid, it is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Pirooz's procedure by treating the semiconductor wafers with O_3 , and then treating the wafers with a liquid containing HCl in a separate bath in order to produce a more efficient procedure for removing the metals from the surface of the semiconductor wafers thereby enhancing the metals removal.

Unlike the claimed invention, Pirooz does not form a treatment sequence which forms a treatment sequence which avoids rinsing with water or another treatment liquid.

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Verhaverbeke discloses wet processing methods for the manufacture of semiconductor wafers. The wet processing methods are applicable to any wet processing equipment including wet benches, baths, or spray cleaning systems. The wafers are exposed to reactive chemical process fluids by being sequentially immersed in reactive chemical process fluids (Column 5, lines 39-45). Traditionally, a DI water rinse is performed between each chemical treatment step (Column 10, lines 19-21). The present invention departs from this principle by not performing a DI water rinse between each chemical treatment step. This obtains good process performance and leads to overall cost efficiency (Column 10, lines 30-35).

It is the Examiner's position that a person having ordinary skill in the art would have found it obvious to modify Pirooz by avoiding rinsing with water or another treatment liquid as taught by Verhaverbeke. The method of eliminating the water rinse would have been expected in order to obtain good process performance (Column 10, lines 30-35). Therefore, the step of rinsing with water between process steps is an optional step that would not need to be performed.

3. Applicant's arguments filed August 14, 2002 have been fully considered but they are not persuasive.

In traversing the rejection based on the combination of Pirooz and Verhaverbeke, the applicants' state that it is not obvious to combine the prior art references since Pirooz teaches water rinsing in between the chemical treatment steps and Verhaverbeke teaches a method for eliminating the water rinse steps. This point is not accepted since Verhaverbeke discloses that the

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water rinse traditionally used in between each chemical treatment step is eliminated in order to lead to overall cost efficiency and to obtain good process performance (Column 10, lines 30-35).

Therefore, it is the Examiner's position that the water rinse steps performed in between the chemical treatment steps are optional steps that need not be performed.

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. (EP 0731498A2)

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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6. Any inquiry concerning this communication from the Examiner should be directed to Charlotte A. Brown whose telephone number is 703-305-0727. The Examiner can normally be reached during the hours of 9:00AM to 6:30PM.

The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After final communications.

CAB

November 12, 2002


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